ISSN 0027-1314, Moscow University Chemistry Bulletin, 2018, Vol. 73, No. 3, pp. 135–137. © Allerton Press, Inc., 2018.
Original Russian Text © N.Yu. Saushkin, J.V. Samsonova, A.P. Osipov, S.E. Kondakov, E.S. Lysova, I.A. Elizarova, K.S. Khaertynov, E.A. Shuralev, 2018, published in Vestnik Moskovskogo Universiteta, Seriya 2: Khimiya, 2018, No. 3, pp. 235–239.

Strip-Dried Biofluids for the Detection of Specific Antibodies in Small, Infected Ruminants

N. Yu. Saushkin[a, *], J. V. Samsonova[a, b], A. P. Osipov[a, b], S. E. Kondakov[a, b], E. S. Lysova[c], I. A. Elizarova[d], K. S. Khaertynov[e], and E. A. Shuralev[c, d, e]

[a] *Department of Chemistry, Moscow State University, Moscow, 119991 Russia*

[b] *National University of Science and Technology MISIS, Moscow, 119991 Russia*

[c] *Department of Applied Ecology, Institute of Environmental Sciences, Kazan Federal University, Kazan, 420008 Tatarstan, Russia*

[d] *Laboratory of Biochemistry and Molecular-Genetic Analysis, Federal Center of Toxicological, Radiological and Biological Security, Kazan, 420075 Tatarstan, Russia*

[e] *Central Research Laboratory, Kazan State Medical Academy, Branch of the Federal State Budgetary Educational Institution of Further Professional Education, Russian Medical Academy of Continuous Professional Education of the Ministry of Healthcare of the Russian Federation, Kazan, 420012 Tatarstan, Russia*

**e-mail: sushk_90@mail.ru*

Received November 12, 2017

Abstract—The specific antibodies for viral arthritis-encephalitis and toxoplasmosis in goats is comparatively determined by the ELISA and latex agglutination reaction using strip-dried samples of serum and whole blood on a porous membrane carrier. It is shown that the use of strip-dried samples makes it possible to qualitatively and quantitatively determine specific antibodies and its results are completely consistent with those of the analysis of the liquid samples (serum). This sample preparation method can be used for the safe shipment of blood samples and following serological studies in epizootic monitoring.

Keywords: caprine arthritis encephalitis, toxoplasmosis, ELISA, latex agglutination test, strip-dried biofluids, dried blood spots (DBS)

DOI: 10.3103/S0027131418030069

INTRODUCTION

The dry blood spot technology (DBS) is widely applied in medical practice. When using this method of analysis, a patient's blood is applied onto the membrane carrier, dried, and then used for the further laboratory determination of various diagnostically significant substances and markers [1]. In particular, this technology is used for neonatal screening, pharmacokinetic studies, therapeutic drug monitoring, and other purposes. By using dry spots of blood and other biological fluids, it is possible to prevent intravenous intervention, reduce the patient's injury by collecting a small amount of capillary sampled material, and reduce the cost of the specialized transportation and storage of samples, since maintaining the so-called cold chain becomes unnecessary and the amount of transported material significantly decreases. Moreover, the technology for obtaining dry biological material can be used to create biobanks and makes it possible to carry out additional studies, which may be required to clarify the diagnosis or check questionable/controversial results, at any time.

In veterinary medicine, biological fluids are rarely used in dry form (on a membrane carrier) for sampling, transportation, and analysis and only a few studies have been published on this topic [2]. Barely any such studies have been performed in Russia, although we have recently published several papers demonstrating the successful use of dry samples of serum and/or blood plasma, whole blood, and whole milk [3, 4]. To prepare dry samples of biological fluids for their subsequent analysis and detection of DNA, antibodies, and hormones (cattle), we have taken a new approach based on the use of a thin strip of a fiberglass membrane. The technology of obtaining dry biosamples on membrane carriers is very promising for use in veterinary monitoring because it simplifies the task of collecting and transporting samples from farms (especially from remote farms) to a specialized analytical laboratory for performing analyses such as the haemagglutination inhibition reaction, latex agglutination (LA), enzyme immunoassay (ELISA), and the polymerase chain reaction. In particular, the approach of applying biological liquids on a membrane to obtain a dry sample can be used for large-scale sampling from cattle, small ruminants (SRs), pigs, and birds in order to perform subsequent serological studies and epizootic control aimed at the detec-